

Native tobaccos (Solanaceae: *Nicotiana* spp.) in Australia and their use by Aboriginal peoples

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ABSTRACT

The use of native tobaccos in Australia by the indigenous population is summarised. The choice of *Nicotiana* species is discussed in relation to their nicotine content. Addiction, ownership, trade and preparation for use, are all described.

KEYWORDS: *Nicotiana*, indigenous Australian tobacco, chewing tobacco, *Nicotiana* preparation, ownership, addiction, trade.

INTRODUCTION

The genus *Nicotiana* (Solanaceae) with about 71 species has its centre of diversity in South America and extends to North America, the Western Pacific and Australia, with a single species in Namibia. Like most species of the Solanaceae *Nicotiana* contains alkaloids that are physiologically active for many animals. Humans have used species of *Atropa*, *Brugmansia*, *Datura*, *Duboisia*, *Mandragora*, *Nicotiana*, *Vestia* and *Withania* for their alkaloid content since records began. In addition, species of *Capsicum* and *Solanum* (including *Cyphomandra* and *Lycopersicon*) are important crops worldwide, while species of *Browallia*, *Brngmansia*, *Cestrum*, *Datura*, *Nicotiana*, *Petunia* and *Solandra* decorate gardens. Weedy *Datura*, *Lycium*, *Nicotiana*, *Physalis* and *Solanum* may infest agricultural crops. The principal *Nicotiana* used by man, *N. tabacum*, arose and was cultivated by local peoples in South America and in pre-Columbian time had spread to North America. In the post-Columbian era, because of its addictive nature, it spread rapidly to the rest of the world and now dominates almost completely world trade in tobacco.

The worldwide spread and use of tobacco is well covered by Gately (2001) and southern American use by Wilbert (1987).

NICOTIANA IN AUSTRALIA

In Australia there are about 22 native species plus three species in the Western Pacific all belonging to the section *Suaveolentes*, which is confined to this region. One species occurs in the Marquesas Islands, and two in New Caledonia and nearby islands. I have found no record of these being used and Riesenfeld (1952) says specifically that the species on the Isle of Pines (*N. fragrans*) was not

cultivated or smoked. Smoking did not occur there until the arrival of the Europeans. In Africa a single species, *N. africana*, was named from Namibia as late as 1975, where it is confined to a few peaks. It is not known to be used. Cytological studies show it to be distantly related to section *Suaveolentes* rather than to American species (Merxmuller and Buttler 1975; Gerstel *et al.* 1979).

The Australian species are widely spread over the continent excepting Tasmania [see maps, Horton (1981) or in Purdie *et al.* (1982)]. They are less common in the far north and have not been recorded from the Kimberleys, Arnhem Land or Cape York Peninsula. Principal speciation has been in the warmer arid and semi-arid mainland of Australia. No native tobacco occurs in New Guinea or New Zealand.

The first Australian species named was *N. snaveolens* Lehm. (1818), the name based on plants cultivated at Malmaison (France) grown from seed from Port Jackson. Further species were named somewhat slowly. Even Bentham (1868) in *Flora Australiensis*, nearly 50 years later, included only *N. snaveolens* with four varieties. This name was applied loosely for many years. The first comprehensive account of the genus in Australia was by Wheeler (1935), a colleague of Goodspeed, whose monograph on the genus was published in 1954 (Goodspeed 1954). Wheeler's account was followed by Burbidge (1960) and Horton (1981). The latter was incorporated, almost unchanged, into the *Flora of Australia* Vol. 29 (Purdie *et al.* 1982). Four more species have been described since then, giving a total of about 22 species.

Most of the Australian species of *Nicotiana* are annuals, or may survive for a second year in exceptionally good seasons. A few of the southern species are short-lived perennials. It follows that supply of leaves will vary greatly from year to year. I have seen sand dunes virtually covered with *N. velutina*, which may be totally absent in

a subsequent year. The supply of the two popular species for chewing – *N. excelsior* and *N. gossei* – growing in the Central Australian ranges may be a little more reliable but *N. ingulba* from the sand plains will be very dependant on irregular rains, especially after bushfires. A number of the early explorers comment on the abundance of plants in some years.

Francis Gregory, in his journal of exploration to the Gascoyne River in Western Australia in 1858 (Gregory 1884), when in the vicinity of the Lyons River on 27 May 1858 stated: “We halted for the night amongst fine grass; melons and tobacco growing very luxuriantly” and on 31 May 1858, a little further on states: “Tobacco here grew to sufficient size for manufacture, occupying many hundred acres of the best land.” There is no mention of Aboriginal use.

Later Francis Gregory, in his journal of exploration to the north-west coast in 1861 (Gregory 1884) stated:

“Tobacco does not grow so luxuriantly here as on the Lyons River, but the natives collect it, and after preparation, chew it; but we did not on any occasion observe them to smoke.”

This may have been *N. benthamiana*, which is scattered but widespread in the north-west and is a favoured species. The party was in the vicinity of the Lyons River on 25 June 1861, but no mention of tobacco was made at the time.

The zoologist, chemist and explorer H.H. Finlayson records that dried tobacco as well as *Duboisia hopwoodii* were stored in caves at Uluru for poisoning smaller waterholes to stupefy emus (Finlayson 1943). He also illustrated a vigorous stand of *N. gossei* in the George Gill Range in southern Northern Territory. Irregular supplies in one area or another are likely to have encouraged trading the leaves.

Latz (1995), see also below, illustrated a large stand of *N. excelsior* in the Mann Ranges.

Alkaloid content. The alkaloid content of the leaves and roots of sixty species of *Nicotiana* was published by Saitoh *et al.* (1985). Because of its relevance to the choice of *Nicotiana* species for chewing, the relevant section of Saitoh’s table is offered here (Table 1).

The spread of tobacco, *N. tabacum*. The product tobacco travelled well in ships as compressed plug tobacco and as cigars (and seed). Its use was soon established in early Portuguese and Spanish outposts followed by cultivation. Haddon (1947) reports tobacco in the Philippines in about 1565, in Ternate (about 1599), Java (about 1601), Japan (about 1605) and Halmahera (about 1616).

Cultivation soon spread to New Guinea which has no native species. It was in active use on the north-east coast before 1886 (Miklouho-Maclay 1886). The use of tobacco for smoking probably travelled from west to east in New Guinea and then across Torres Strait.

Riesefeld (1952) presented a detailed account of the spread of cultivation of tobacco in New Guinea and stated:

“In Torres Strait tobacco is smoked as far south as Murolog Island (just off the tip of Cape York Peninsula) and its cultivation is recorded on many islands. A few tobacco pipes found on Cape York have been shown by Haddon (1947) to be of Torres Strait origin, as, no doubt, is also the habit of smoking on Cape York, the only Australian region where tobacco is smoked”.

The latter statement is not strictly true, as tobacco seems to have been smoked further west along the north coast of Australia (see below). Riesefeld’s map clearly indicates the passage of smoking across Torres Strait to Cape York. It is of note, too, that there is no mention of chewing tobacco in this detailed account. McCarthy (1939) states specifically that tobacco was amongst the goods traded by the Malays from Makassar (Celebes) and Kupang (Timor) from an early date. The chief centres in northern Australia where the Makassans fished were at Malay Bay, Elcho Island, Caddell Strait, Milingimbi Island, Caledon Bay and Groote Eylandt. Capt. J.B. Jukes while surveying on H.M.S. *Fly* in 1847 recorded its use in Cape York (Jukes 1847). Here it was smoked, and Jukes notes that the informant knew exactly what to do with a cigar.

Tobacco in Australia. Ships trading to the Americas soon introduced tobacco to Europe and it had become well established by 1600 (Gately 2001). Tobacco was chewed, snuffed and smoked; the dominance of cigarettes was a later development.

The historian Samantha Fabry stated that tobacco did not form part of the provisions of the First Fleet to Australia, but was included in the stores held by the ships’ captains. Shortly after the First Fleet’s arrival in 1788, Major Ross purchased a quantity of tobacco from the Master (Captain) of one of the returning ships for the marines who were, he said, “so much distress’d for tobacco” (Fabry 2004).

Early urbanised Aborigines would soon have used tobacco. Such use is illustrated in Dutton (1974) in a picture by Augustus Earle of a native family dated about 1826 in which the man is smoking a pipe. This aspect of smoking by urbanised native peoples will not be considered further here.

Early records of smoking by non-urbanised native peoples are all from the northern near-coastal regions of Australia. This is almost surely the result of contact with Macassan and other possible Asian visitors in addition to the progress from New Guinea across Torres Strait. Macknight (1972) considered that the Macassan voyages to the north coast of Australia ceased about 1906–07. Records of smoking in northern Australia using bamboo pipes may be found in several accounts.

J. McGillivray, doctor and naturalist, together with T.H. Huxley under Owen Stanley on H.M.S. *Rattlesnake*, while surveying Torres Strait in 1850, noted:

“The custom of smoking, so general throughout Torres Strait, has been introduced to Cape York. The most addicted to it were the Papuans above mentioned, but many of the Australians joined them, and were equally

Table 1. Alkaloid contents of *Nicotiana* species. After Saitoh *et al.* (1985). tr = trace.

<i>Nicotiana</i> section Suaveolentes	Total content mg/g dry weight	Leaves				Total content mg/g dry weight	Roots			
		% of total					% of total			
		Nicotine	Nornicotine	Anabasine	Anatabine		Nicotine	Nornicotine	Anabasine	Anatabine
<i>N. africana</i> Merxmuller and Buttler*	6776	4.7	92.4	0.3	2.6	7698	45.0	45.1	1.0	8.9
<i>N. amplexicanlis</i> Burbidge	4959	98.5	0.3	tr	1.2	7648	71.8	3.1	11.9	13.2
<i>N. benthamiana</i> Domin	3602	80.8	0.6	16.1	2.5	3826	68.4	1.4	26.3	3.9
<i>N. cavicola</i> Burbidge	285	16.8	76.9	6.3	tr	3798	58.0	9.1	25.4	7.5
<i>N. debneyi</i> Domin	2457	31.1	15.8	46.0	7.1	3038	34.7	1.4	53.2	10.7
<i>N. excelstor</i> (J. M. Black)	4772	95.9	1.1	0.9	2.1	4772	66.5	1.4	20.0	12.1
<i>N. exigua</i> Wheeler*	7692	70.0	26.0	1.5	2.5	12040	60.1	1.8	21.2	16.9
<i>N. fragans</i> Hooker	14985	91.0	0.4	0.4	8.2	13344	81.4	0.8	1.1	16.7
<i>N. goodspeedii</i> Wheeler	730	5.5	68.4	21.1	5.0	4284	67.8	1.3	26.6	4.3
<i>N. gossei</i> Domin	12169	98.8	0.3	0.2	0.7	7222	73.8	0.9	17.9	7.5
<i>N. hesperis</i> Burbidge	4108	52.1	0.4	44.3	3.2	1930	22.1	1.2	74.9	1.8
<i>N. ingulba</i> J. M. Black	669	7.5	44.8	42.2	5.5	4804	46.3	4.5	42.3	6.9
<i>N. maritima</i> Wheeler	608	7.2	70.4	15.8	6.6	14030	20.8	30.0	44.5	4.6
<i>N. megalosiphon</i> Heurck and Müll.	5566	18.5	42.0	39.5	tr	5566	50.5	1.8	43.7	4.0
<i>N. occidentalis</i> Wheeler	519	9.4	75.1	15.4	tr	6490	41.5	14.6	39.5	4.4
<i>N. rosulata</i> (S. Moore) Domin	992	24.9	70.8	3.0	1.3	3376	85.6	1.7	10.5	2.2
<i>N. rotundifolia</i> Lindley	4949	96.6	0.8	2.1	0.5	4912	53.9	1.1	40.7	4.3
<i>N. simulans</i> Burbidge	258	14.0	67.0	19.0	tr	6624	45.1	6.4	44.3	4.2
<i>N. suaveolens</i> Lehmann	4954	85.0	13.6	0.9	0.5	6658	51.7	9.9	29.0	9.4
<i>N. umbratica</i> Burbidge	43	51.2	48.8	tr	tr	9932	43.3	23.5	27.8	5.3
<i>N. velutina</i> Wheeler	5276	2.8	88.4	8.1	0.7	24817	52.9	13.4	32.3	1.4

* Species did not bloom

elamorous for tobacco. ... The pipe is a piece of bamboo as thick as the arm and two or three feet long, is first filled with tobacco-smoke, and then handed round the company seated on the ground in a ring – each takes a long inhalation, and passes the pipe to his neighbour slowly allowing the smoke to exhale. On several occasions at Cape York, I have seen a native so affected by a single inhalation, as to be rendered nearly senseless with the perspirations bursting out at every pore, and require a draught of water to restore him.” (McGillivray 1852: 126–127).

The explorer F. Jardine, when near the apex of Cape York, Queensland, in 1865 makes the comment:

“The black guides were not forgotten, and received their reward of biscuit and tobacco. The manner in which they use this latter is curious and worthy of notice. Not satisfied with the ordinary ‘cutty’ [a short pipe] of the whites, they inhale it in volumes through a bamboo cane. The effect

is profound stupefaction, which appears to be their acme of enjoyment.” (Jardine 1998).

J. Bancroft, doctor and chemist in Brisbane, records a rather sad request for tobacco:

“I was much struck with this tobacco-want when passing through Torres Straits lately. Steaming slowly among the islands of that calm sea the vessel encountered a native and his wife in a bark canoe. The only word they used was ‘Tabac, tabac’. A loaf of bread was thrown to them, but this did not satisfy; and in the wake of the steamer there could still be heard the cry, ‘Tabac, tabac!’” (Bancroft 1878–82).

The Gregory brothers, Augustus and Francis, conducted several expeditions in northern Australia between 1846 and 1861. The journals of these explorations were published in a single volume in 1884 under the authorship of Augustus and Francis Gregory. Augustus Gregory in 1855, when

in the vicinity of Port Albany Island and the mainland of Cape York, states:

"Some canoes with natives came to the vessels. They evidently have frequent communication with vessels passing through the Straits, and are well acquainted with the use and name of tobacco, which they smoke in large bamboo pipes." (Gregory and Gregory 1884).

Telegraphist and anthropologist F. J. Gillen recorded smoking in his 'Camp jottings' while on an expedition to northern Australia with Spencer in 1901–1902. Gillen states:

"Another of their adaptations is the Chinese pipe which is modelled on the pipe used for smoking opium by the Chinese. We first saw these pipes at Powells Creek and since then there have been one or more in every camp visited. ... The method of smoking this pipe is to take half a dozen rapid whiffs and then inhale as much as they can swallow retaining it for a minute or two and then puffing it off through the mouth and nostrils. ... The Chingilli Umbai and Gnanji powder up tobacco mix it with an equal quantity of white ashes and chew the mixture. Curiously none of these tribes appear to have had a substitute for tobacco before the white man penetrated the interior. ... We have not seen a plant of *Nicotiana suaveolens* ... nor of *Duboisia hopwoodii* north of the Barron." (Gillen 1901–1902).

Howard (1933) described early English trading activities on the north coast of Australia. Among the list of items to be traded was tobacco and short-lived trading posts were established at Melville Island in 1824, Raffles Bay in 1827, and Port Essington in 1838.

The anthropologist, Donald Thomson, devoted an article on the smoking pipes of north Queensland and the Northern Territory (Thomson 1939). He stated that:

"There is evidence for the belief that the use of tobacco has been known in North-Eastern Australia for a considerable time; nevertheless there is nothing to suggest that any attempt to grow tobacco was ever made by any of these people, although it was grown by their neighbours in Torres Strait."

Thomson goes on to describe the bamboo pipes as well as the use of a large crab claw as a short stocky pipe. He also notes the power of addiction and adds:

"Under the 'drive' for tobacco the natives will undertake long journeys and endure unbelievable hardships, to obtain a few ounces of trade tobacco. ... a native will sell anything he possesses for a small quantity of tobacco."

While smoking with pipes of Asian origin became established in northern Australia, smoking with pipes of European origin was soon practised in southern Australia.

Thomson (1939) illustrates examples of bamboo and crab-claw pipes. By these dates the tobacco likely to be traded is *Nicotiana tabacum* (American tobacco) as there is no evidence that local native peoples cultivated the plant, nor that native Australian tobacco was traded so far north.

Carl Wilhelmi, a German horticulturist and botanist, visited South Australia and in late 1849 made a journey to the lower River Murray. When in the vicinity of Wellington he observed the Aboriginal canoes and noted, "A small fire was burning in the middle of the small craft, from which they could light their pipes".

Later in 1850–1851 Wilhelmi travelled to Moorunde and then down the River Murray. During part of this journey their goods were carried on a boat crewed by five Aborigines and "... they were willing to take our things with them when they heard that they were to receive tobacco and white money" (Wilhelmi 1857). Later, when crossing Lake Alexandrina to Goolwa, the party exchanged half a stick of tobacco for a large Murray cod. These few incidents show that pipe smoking was practised and tobacco readily traded in the mid 1800s by Aboriginal people still largely practising their original life style.

All these examples show that smoking and the use of tobacco was established in the north coast of Australia before the use of indigenous tobacco was recognised by the European population.

The use of native tobacco, *Nicotiana* spp. The first Central Australian records of the use of native Australian species of *Nicotiana* appear to be those of Helms (1891) on the Elder Expedition and Stirling (1896) on the Horn Expedition. Since then many writers have described the collection and preparation of *Nicotiana*. David Carnegie, engineer, gold miner and explorer, on his epic journey almost due north of Menzies (Western Australia) in 1896 records the making and chewing of a quid with ashes but does not name the plant used (Carnegie 1898). H. Basedow, anthropologist and explorer, using the term 'pitjuri' confused *Nicotiana* and *Duboisia*, but was clearly referring to *Nicotiana* when describing its use in the valley of the Finke River and the MacDonnell Ranges. He described the typical preparation of a quid and comments:

"... they look upon pitjuri-chewing in company as a social comforter, which fosters mirthfulness and friendly fellow feeling" (Basedow 1925).

In 1933 J. B. Cleland, pathologist, botanist and anthropologist, together with T. H. Johnston, zoologist and anthropologist, published a major paper on pituri. They attempted to sort out the confusion in the use of the word 'pituri'. Their paper is a major source of early references and although the emphasis is on *Duboisia* it does include useful material on *Nicotiana* (Johnston and Cleland 1933–1934).

C. Chewings, in a popular book on the Aboriginal peoples, again described the preparation of a quid and also included the use of plant roots (Chewings 1936: 31–32). Likewise A. Groom, author of another popular book, records pituri growing in stream bank sands and that:

"We travelled through about a hundred acres of the pituri, growing about three feet high, very much like tobacco. Tamalji and Njunowa darted through it, selected and pulled leaves, and piled them in bundles on the camels

until we resembled a travelling market garden; I was left walking beside Tiger, who was leading the team. 'Pituri,' Tiger explained, 'we take plenty back to Areongonga people. We get three shillings a sugar bag, sometime more.' [This was *N. gossei*] (Groom 1950).

Later Donald Thomson spent time with the Bindibu (= Pintubi) Aboriginal peoples in the Western Desert. This tribal area is in the vicinity of Lake Mackay on the border between Western Australia and the Northern Territory. This is extremely harsh country and Thomson gives a detailed account of the enthusiastic collection of *Nicotiana ingulba* and its preparation. His notes show the avidity with which it was appreciated:

"Soon after they had chewed the concoction the men, invariably tired after hunting, would rest reclining on their elbows or loll on the ground in other relaxed attitudes. Invariably, on their return to camp, they would devote themselves to the preparation of the chewing quid if they had collected the ingredients, rather than attend to the less laborious and seemingly more immediate task of preparing food." (Thomson 1975: 81-91).

C. Godard, linguist, and A. Kalotas, botanist, in an account of plant use by the Yankunytjatjara quote an account by Sam Pumani, again on the demand for and satisfaction of chewing tobacco (Godard and Kalotas 1985):

"Suppose they were poorly off for tobacco, without any leaf. 'We're out of leaf.' In this case the people who have passed away would turn to the stalks. And grind them and chew them dry, suck on them bite them. 'Well, I'll just have to chew this. I can sort of chew the stalks! My mouth's gone dry. Since I don't have any leaf I'll just have to carry stalks around with me.' The people who have passed away would take stalks around with them, when they did not have leaf. They'd grind the stalks into a quid. After grinding them to a powder they'd carry the quid around with them. The remaining stalks would be kept wrapped in emu feathers. They put them in emu feathers. And after grinding and softening them, they used to chew them, stringing it out to make it last. And as the hills got close, fresh tobacco would get close. Then they would throw away the stalks. Yes, throw the stalks away. Break off some fresh tobacco, and after that, singe the leaves on a fire. As they were doing that, one might say: 'Hold on, I'll just suck on a fresh leaf!' He'd suck it alright, the one without tobacco. Yes, then his eyes'd lift up, from chewing that tobacco. 'Oh, yes! I am chewing tobacco at last! I've been without it for ages!' 'Oh, quick, I can sleep with it in my mouth.' They would talk about sleeping with it in the mouth. 'Oh, to sleep with the stuff!' As it gets dark, they'd be saying: 'Oh I'm going to sleep with it!' And he'd sleep with it holding it in mouth. He doesn't sleep without it. When day breaks they would tuck it behind the ear, and carry it around with them. And would travel around contented, with it in the mouth. They'd feel satisfied. They put some in the mouth and travel around, looking out for game."

P. Brokensha, in his book on Pitjantjatjara crafts, provided some pictures of tobacco preparation in the

Musgrave Ranges. He stated that few of the community smoked but that many men and women chewed tobacco (Brokensha 1975).

Finally, the authoritative book by Peter Latz, botanist, ethnobotanist and ecologist, devotes a chapter to the use of *Nicotiana* with illustrations of the principal species in Central Australia (Latz 1995).

Preparation of tobacco. Collecting could involve the gathering of the whole plant, sometimes including the roots, or just stripping leaves off large plants. Usually the material was wilted or partially dried on a clean surface, warm sand or by a fire before use. Occasionally it was air dried and stored. It may be ground down or broken into sufficiently small pieces to chew and make into a quid. Almost invariably clean white ash prepared from a number of shrubs, *Acacia aneura*, *A. coriacea*, *A. kempeana*, *A. ligulata*, *A. pruinocarpa*, *Grevillea striata*, and some *Encalyptus* barks was added to the quid (Meggett 1966).

An analysis of the ash of *A. salicina* was published by Higgin (1903) and it was shown to be strongly alkaline. The ash is known to facilitate the release of alkaloids as is the practice of using lime with betel nut. Lime was also used by South American tobacco addicts (Wilbert 1987) who, like the betel nut chewers, used a small gourd to contain the lime.

The use of *Nicotiana* root. In his description of the use of *N. ingulba* by the desert Bindibu people, Thomson (1961) stated specifically that the entire plant complete with taproot was pulled up and this can be seen in his figure 1. In his description of the preparation and use he makes no mention of stalks or roots but elsewhere the use of stalks as second grade tobacco has been described (Godard and Kalotas 1985). There is every reason to suggest that the roots might well be included with the stalks. The roots of *N. ingulba* have a moderate yield of alkaloids, of which 46% is nicotine.

An early record of the use of *Nicotiana* roots was given by Cleland and Johnston (1933). They stated that leaves, stems and roots of *N. ingulba* are all used, being dried and ground up on a stone. This is also repeated by Chewings (1936), but here the suggestion is that it might have been *N. gossei*, of which the leaves are very popular.

This is a convenient place to note the record by George French Angas, artist, traveller and author, on the use of a root with narcotic properties. He states:

"The Tattayarra Tribe: An intoxicating root is also frequently used by them: it grows in the scrub and when taken has much the same effect as opium." (Angas 1847).

No other information is given. The identity of this root has not been confirmed. Cleland (1966) suggested that it might be *Cyphanthera myosotidea* but there are no other records of its use. No *Nicotiana* is known from the Tatiara region but two species, *N. goodspeedii* and *N. maritima*, both reach the areas near the Murray River mouth and *N. goodspeedii* can be abundant on flats and mallee areas

on the lower River Murray. Both species may be short-lived perennials and develop a tap root. Both species would be within easy trading distance of the Tatiara region.

That the roots of *N. goodspeedii* may have been used is supported by the account in Cleland (1957). He records that:

“Early in 1954 Mr W. B. MacDougall forwarded me material which Mrs E. Robertson identified as *Nicotiana goodspeedii*. He did not know how reliable his information was, but one native told him that only the roots were used as pituri for chewing, and another that the leaves were dried and then used as well as the roots. Both said that it was very potent. The Kokota name given was ‘towell-towell’ or ‘dowell-dowell’. Mr MacDougall found it growing in sheoak valleys from Lake Maurice to the east-west railway line and in ‘crab-holes’ on the edge of the Nullarbor Plain as far south as Lake Tallacootra. The natives said that it grew as far east as Wynbring Rocks. It is abundant on Yalata.”

Mr MacDougall was, I believe, a ranger employed at the Woomera Rocket Range.

Nicotiana goodspeedii grows in the area indicated to the virtual exclusion of any other *Nicotiana*. The high nicotine content and yield indicate that the roots of *N. goodspeedii* may well have been appreciated (Table 1). This species is not particularly leafy and in dry seasons persists as an almost leafless crown surmounted by dead seed stalks. The tap root would still be available for use when all leaves had withered.

As trade in American tobacco via Europe increased and pipe smoking spread to the pastoral stations, native tobacco was sometimes combined with traded tobacco.

The botanist and explorer, Alan Cunningham, in his journal during Oxley’s land journey (Lee 1925), reported the interesting and early use of native tobacco by white men. He states:

“June 21st 1817 in the vicinity of Peel’s Range NSW, *Nicotiana undulata* [= *N. suaveolens*] is very frequent on these flats, the lower leaves of which our people gathered, and when dried found them not a bad substitute for its congener *N. tabacum*, although not so strong a narcotic.”

The use of native tobacco by station hands in pipes was recorded by Johnston and Cleland (1933–1934). Station managers also appreciated the value of native tobacco.

On herbarium sheets in the State Herbarium of South Australia, C. T. Madigan in 1944 recorded the collection and storage of pituri by the station owner at Huckitta Station. His label states:

“A central Australian tobacco used by the Aborigines. Note capsule fruits. Pituri from Huckitta Stn. NE of Alice Springs. This material gathered and stored by the station owner especially to distribute to the natives. An unusually stout specimen.”

The specimen is *Nicotiana ingulba*.

R.A. Gould described the overlap in the use of native tobacco with traded European tobacco (Gould 1969:

181, 185–186, 207). At Warburton he exchanged plugs of tobacco and cigarettes for information and favours. He found that the older men preferred to tear open a cigarette and chew the tobacco and that younger men preferred to smoke a cigarette, as wearing a cowboy hat interfered with placing a quid behind the ear. Premasticated balls of tobacco were stored in circular cans and were passed around at meetings or ceremonies. With knowledge of cigarettes, native tobacco was sometimes rolled in newspaper to make a cigarette as described by Wallace and Wallace (1973).

O’Connell *et al.* (1983) in their paper on traditional and modern plant use among the Alyawara of Central Australia, stated:

“Since World War II the use of native tobacco has declined in favour of the pressed plugs of cultivated varieties distributed in government rations or sold in local cash stores. However, the more powerful local forms are still collected whenever encountered.”

Addiction. An example of Aboriginal craving and probable addiction to tobacco is indicated in this letter, which is attached to a specimen of *N. gossei* in the Melbourne Herbarium. It is from E. Ryans and dated 24 January 1887:

“I am forwarding by this mail a sample of ‘Engoulba’, native name for ‘Pitcheri’ or native tobacco that grows in this locality, it only grows in two places here and near Doctors Stones, the natives come many miles for it and some of them preserve it from one season to another. The Blacks partly roast it and chew and suck and swallow the juice which acts on them like opium on Chinese, it makes them dead drunk for about 24 hours. They save the pulp after sucking the juice for smoking, they take an extra dose when they are hungry or hard pressed for water. It would also save a white mans life if hard up for water by chewing a little bit of it raw. I am informed it has killed some bullocks on Mr Stokes’ run eating it while it was green. Gov. [government] Well Party, Old Depot, OT [Overland Telegraph] line via Charlotte Waters.”

Donald Thomson (1961) also comments on addiction to tobacco by the Bindibu (= Pintubi) people of the Western Desert in Western Australia:

“Observations on the behaviour of the tobacco-chewing groups among the Bindibu, with whom I lived in close proximity for some months, led me the conclusion that the chewing of the *Nicotiana* quid described in this paper was practised under a compulsion or craving which appeared to have a physiological rather than a social basis. The urge to chew would begin to manifest itself when the hunting party was far out on the dunes and while the men were still hunting ... The preparation of the chewing quid would take precedence over the preparation of food.”

An example of enthusiasm, with some social comment, is provided by Hansen and Hansen (1974) from the Pintubi people of the Western Desert in a Pintubi post-primary reader:

“Pluck mingkulpa plants. Let us cook and eat it. Pluck mingkulpa plants. Don’t bring back the weak leaves – bring back the strong ones. Let us try it first. Don’t bring back the weak leaves without trying it. Let us bring back ash tree to mix with the mingkulpa. Let us eat it together with the ash, we who are starving for mingkulpa. Let us eat it, so it can burn our throats. When walking without water, chewing mingkulpa is good to keep one alert. Let us cook and eat mingkulpa. One should break his lump in half and give it to another. After preparing it, let us hide it in the shelter, so the women won’t grab it from us. Let us carry it in our pockets. If you keep it where people can see it, they ask you for it, and finish it all up. Not only mingkulpa but tin of tobacco and cigarettes as well. We are all eating that mingkulpa which is from the white man, cigarettes and tobacco, it is very good mingkulpa. That which grows on the hills is called pinatilypa [possibly *N. gossei*].”

Ownership. When writing of pitjuri, Basedow (1925) in his book on the Australian Aborigines, confused *Duboisia* and *Nicotiana*. However, as he stated:

“The Arundta and latterly the Aluridja as well regularly collect as much pitjuri as they want in the valley of the Finke and other gorges of the MacDonnell Ranges while the Wongapitcha have their sources in the Musgrave and Everard Ranges.”

These are prime areas for *Nicotiana*. Basedow goes on to state:

“The collecting grounds are as a rule owned by a circle of old men, each of whom clearly defines his boundaries by placing a number of stones upon the ground. A proprietor may give another person necessary permission to gather leaves on his plot according to certain terms agreed upon.”

The concept of ownership is also recorded by the anthropologist, Tindale (1974). He states:

“Trespassing to hunt was one of the main causes of fights between tribes, as well as persons of local groups within tribes all over Australia.”

He quotes an example:

“The thought that native tobacco growing in the cave mouths and other sheltered places after rain, might have been the object of plundering was anathema to the old man . . . [he] was very much disturbed because these plants were considered particularly precious possessions by the horde.”

Tindale also recorded the attention of the Aborigines to the natural growths of tobacco.

“In the arid environment of the Western Desert . . . the men know most of the places where the tobacco flourishes and watch over its growth. They are zealous in watching over maturing plants. The plants are associated with specific ‘kulpi’ or rock shelters linked with clan totems, hence can be very particular possessions of the clan. Thus trespass to take tobacco is considered a serious matter.” (Tindale 1974).

Trade. Aboriginal trade routes were extensively developed through arid Australia (e.g., pearl shell from

the north-western coast was traded as far south as Ooldea in South Australia). *Duboisia*, pituri, from the Mulligan River area of south-western Queensland was traded as far south as the northern Flinders Ranges in South Australia, west to the Central Australian Ranges and north-east into central Queensland. Early records of trade in *Duboisia* may be found in Baneroft (1878) and Gregory and Gregory (1884). The anthropologist F. D. McCarthy (1939) presented a number of maps of trade routes in Australia extending over most of the continent. His map number 13 combines the routes for both *Duboisia* and *Nicotiana*, at least in the principal central region. In fact, they may have extended further west than shown there (McCarthy 1939). The *Duboisia* trade is further extended in Watson (1983). Trade in *Duboisia* will not be considered further here.

The principal trade in Australian *Nicotiana* species originated further west than that of *Duboisia* in the Central Australian Ranges and included the trade route to Ooldea, south of the eastern borders of the Nullarbor Plain. This epic route required following 27 rockholes and could take approximately 35 days to reach Ooldea (Jaldi). Tobacco was exchanged for wombat fur, and for red, white and yellow oehre (Berndt 1942). From Ooldea, the route went west, at least touching Fraser Range and eventually joined a trade route from the north-west coast, and east towards Lake Torrens.

An interesting side effect of the trade in tobacco is a few records of *N. excelsior* (a popular species) being collected long distances from the main occurrence of the species with no evidence that they represent disjunct local populations (Fig. 1). These sporadic occurrences are almost surely the result of the distribution of seed from the trade tobacco. The following specimens, all in the State Herbarium, Adelaide, represent such plants.

1. R. Helms, 23 December, 1891, Fraser Range (south-eastern Western Australia). [AD 97433242]

2. M. Koch 118, August 1899, Mount Lyndhurst. [AD 97602403]

3. E. H. Ising, 20 September, 1951, Evelyn Downs. Called Pituri and chewed by the natives. Growing near S M homestead [?station manager] and said by native Hector and Jerry not native to this place but coming from a long way NW (?Everard Park). Evidently grown from material obtained for chewing. [AD 97413288]

4. Mrs Waskett, 14 December, 1955, Oodnadatta. [AD97413289]

5. P. Horton 209, 28 August, 1980, Far NW Aboriginal family settlement, 68 km SSE of Mt Davies Camp and 73 km north-west of Mount Lindsay. Single erect herb in red sand near bore in low sand dune country. Chewed by local Pitjantjatjarra people, possibly brought here by them. [AD 98565306]

Nicotiana excelsior is an easily recognised species as is *N. gossei*. If *N. iugulba* was also traded, disjunct occurrences may not be so easy to recognise as its distribution appears to overlap that of *N. rosulata*.

However, no strays were recognised in the collections of these species at Adelaide.

Species of *Nicotiana* used for chewing. Latz (1995) gives a detailed account of the species used in Central Australia. The plants are illustrated, Aboriginal names are given and the notes below are his, except where indicated by square brackets.

N. benthamiana: This species is used as a chewing tobacco throughout its range. It is considered inferior if other 'stronger' species are available. [Also recorded for Western Australia by Reid and Betts (1977)].

N. cavicola: [Mainly western in its distribution and recorded for Western Australia by Reid and Betts (1977)].

N. excelsior: This is an important plant for the Pitjantjatjara people. They know where to find the best stands (usually in caves) and often travel considerable distances to obtain them. [Also recorded for Western Australia by Reid and Betts (1977). While plants may be found in cave mouths, large populations are in open sites].

N. glauca: Found in the southern quarter it is reported to be chewed by the Pitjantjatjara people as a drug. [An introduced Argentinian species].

N. goodspeedii: [Cleland (1957) records this being used, both tops and roots, by Aboriginal peoples at the eastern end of the Nullarbor Plain and to the south].

N. gossei: Occurs in most of the major ranges of the area. This is probably the single most important plant to the Central Australian Aborigines. The literal translation of the Alyawarr name for this plant is 'bone-marrow tobacco' and bone-marrow is considered the ultimate delicacy. [The name *N. suaveolens* was wrongly applied to this species in early records].

N. megalosiphon: Treated with disinterest.

N. occidentalis: Treated with disinterest.

N. simulans: Treated with disinterest. [Peterson (1979) reports the use of this species amongst the southern Walpiri people but ranked the last of three].

N. rosulata subsp. *ingulba* "Because it is available over a wide area and large amounts can be gathered in a good season, this is the plant most often used for pituri. Its potency varies somewhat from area to area, but is generally considered to be less potent than species found growing in the hills ... This plant is especially important for the Pintubi and features in their mythology". [Horton's (1981) treatment presents the names as given here. Other taxonomists prefer to maintain them separately. In which case the name *N. ingulba* applies to Central Australian populations and *N. rosulata* to more southern and western populations.].

N. rotundifolia: [Cleland and Tindale (1959) list this species as not used in the vicinity of Haasts Bluff, Central Australia. The species does not grow in this region and the name was wrongly applied to what may be *N. simulans*.].

N. species: [Reid and Betts (1977) record *N. suaveolens* being used in the Coolgardie area but on p. 145 quote D. A. Herbert stating that: "The natives in the country behind Port Hedland go out of their way to collect the leaves ...". Two species of *Nicotiana* are recorded in the vicinity of Port Hedland. The first is a strongly glandular species, *N. occidentalis*, which Latz (1995) says is treated with disinterest. The second is *N. benthamiana*, which is one of the favoured species (see above) and is highly likely to be the one referred to by Herbert. See also Gregory (1884) who probably refers to this species.].

N. suaveolens: [The species, recorded by A Cunningham in Lee (1925) was used by 'our people' and it is not clear whether this included Aboriginal peoples.].

N. velutina: Occurs throughout Central Australia. It grows in most habitats, but is especially abundant on limestone river banks or above salt lakes [and on sand dunes]. It is a weedy plant. It is rarely if ever used by Aboriginal people.

Favoured species. Latz (1995) writes of the popular species in Central Australia roughly in the order shown in Table 2 to which *N. tabacum* has been added. It is of interest to add the chemical analysis from Saitoh *et al.* (1985) and see the close relationship of choice with nicotine content.

Note that the spurned species, *N. velutina*, has the 'wrong' alkaloid nornicotine.

Well may Norman Tindale (1974) say: "One of the few luxury crops harvested by the Aborigines and that chiefly in the central desert regions is native tobacco".



Fig. 1. Distribution of *Nicotiana excelsior*.

Table 2. Most favoured species of *Nicotiana*. tr = trace.

<i>Nicotiana</i> species	Total Yield (mg/g)	Nicotine	Nornicotine	Anabasine	Anatabine
<i>N. gossei</i>	12169	98.8	0.3	0.2	0.7
<i>N. excelsior</i>	18902	95.9	1.1	0.9	2.1
<i>N. benthamiana</i>	3602	80.8	0.6	16.1	2.5
<i>N. rosulata</i>	992	24.9	70.8	3.0	1.3
<i>N. megalosiphon</i>	319	18.5	42.0	39.5	tr
<i>N. simulans</i>	258	14.0	67.0	19.0	tr
<i>N. occidentalis</i>	519	9.4	75.1	15.4	tr
<i>N. ingulba</i>	669	7.5	44.8	42.2	5.5
<i>N. velutina</i>	5276	2.8	88.4	8.1	0.7
<i>N. tabacum</i>	11462	94.8	3.0	0.3	1.9

And Latz (pers. comm. 2005) says “I consider (*Nicotiana*) was the most important plant substance to the arid- and semiarid-land Aborigines”.

ACKNOWLEDGMENTS

I am grateful to my wife Judith for assistance, to Robyn Barker for many helpful criticisms and for supplying internet information and to Evelyn Bourne for typing the manuscript.

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Accepted 22 July 2005